

REMARKS

Applicants appreciate the clarification of the Office Action by the Examiner.

DRAWINGS

On page 2 of the Action, the Examiner indicated that the proposed drawing corrections received on December 15, 2003 were not approved because Fig. 39 needed correcting where the section view "A-A" needs to be designated by an Arabic or Roman numeral corresponding to the view number of the sectional view.

Being filed concurrently herewith is a letter requesting approval of changes to the drawings in which it has been requested that the section view designated "A-A" be deleted all together. This drawing change was approved in divisional application Ser. No. 10/334,068, now U.S. Patent 6,761,033 issued July 13, 2004.

In addition, Applicants are filing concurrently herewith a complete set of corrected formal drawings containing the drawing correction to Fig. 39 and the drawing corrections previously requested and which are identical to the drawing changes approved in divisional application 10/334,068, now U.S. Patent No. 6,761,033.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102

Claims 1, 12, and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ito et al. U.S. Patent No. 5,660,045.

Claims 1-5, 12, 13, 15 and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kuroda et al. U.S. Patent No. 4,898,001.

Claims 1, 4, 5, 12 and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kusaba et al. Japanese Patent No. JP-355046309A.

For the reasons set forth hereafter, it is submitted that claims 1-5, 12, 13, 15 and 16, as amended, are patentable.

ALLOWABLE SUBJECT MATTER

Claim 6 was only objected to as being dependent upon a rejected base claim but was stated to be allowable if rewritten in independent form. Claim 6 has now been amended to be in independent form and in addition, the descriptive words "a planform trapezoid" have been deleted and replaced by the words "--a generally triangular--" to define the shape of the openings. This amendment has been made to make certain that the embodiment shown in Fig. 39 is covered.

PATENTABILITY OF THE CLAIMS

Applicant's invention relates to a gas turbine combustor having a combustion chamber and annular premixing fuel passage

therein formed by inner and outer walls. A plurality of premixing nozzles are mounted in spaced relationship in the premixing fuel passage. A plurality of spaced openings are formed in the outer wall of the premixing fuel passage, through which air flows to mix with fuel from the premixing nozzles and form a swirling flow with respect to each of the premixing nozzles. The spaced openings are disposed in a circumferential direction whereby one opening is provided for each of two adjacent nozzles. For each two adjacent nozzles, a swirling flow of air and fuel is formed around each nozzle with the swirling flows rotating in opposite directions.

Independent claim 1 has been further amended to define the air which flows through the spaced openings to mix with the fuel from the premixing nozzles and form a swirling flow with respect to each of the premixing nozzles, runs along an axial direction of the premixing flow passage. Independent claims 1, 12, 13, 15 and 16 have been amended to define that the spaced openings are disposed in a circumferential direction whereby one opening is provided for each two adjacent nozzles at an immediate position between the two adjacent nozzles in the circumferential direction.

Through the provision of the openings at the outer wall so as to cause a swirling flow along the axial direction of the premixing flow passage in the manner according to the newly added distinguishing features of the present invention,

the air in the premixing flow passage is greatly stirred within the flow passage cross section by a simple structure and the mixing of the air with fuel is accelerated.

Further, through the provision of each one opening with respect to two adjacent premixing nozzles arranged at the intermediate position thereof in the circumferential direction, the number of the openings is relatively reduced and the production cost of the gas turbine combustor can be reduced.

It is submitted that none of the cited references, taken either alone or in combination, disclose Applicants' invention as now claimed.

With respect to Ito et al. U.S. Patent No. 5,660,045, Ito nowhere discloses the use of the newly added distinguishing limitations of the openings being formed so as to cause swirling flows which run along an axial direction of the premixing flow passage and each of the openings is provided for each two adjacent nozzles at an intermediate position between the two adjacent nozzles in the circumferential direction.

Fig. 14 of Ito illustrates a cross sectional view of the Ito invention in an axial direction of a gas turbine combustor in which a provision of having one opening with respect to each two premixing nozzles is not disclosed. Moreover, a swirling flow formation by the opening is nowhere disclosed.

The Examiner suggests to combine Yoshida et al. (JP-08135969) which the Examiner contends discloses the swirling flow formation by openings, with the teachings of Ito. However, the rotation axis of the swirling flow caused by the openings provided at the inlet of the premixing flow passage is directed in a perpendicular direction with respect to the premixing flow and no swirling flow is formed along the axial direction of the premixing flow passage. Accordingly, even a combination of Yoshida with Ito does not suggest the newly added distinguishing features.

With respect to Kuroda et al. U.S. Patent No. 4,898,001, Applicants believe that the Examiner misunderstands this patent in stating that nozzle (22b) is provided in the premixing flow passage. The nozzle (22b) of Kuroda et al. is provided inside the head combustion chamber (11) and not in the premixing flow passage.

The premixing flow passage in Kuroda is designated by the numeral 38 in Fig. 5 and 43b in Fig. 19. Therefore, Kuroda does not disclose the provision of one opening with respect to two adjacent premixing nozzles arranged in the circumferential direction as in Applicants' claimed invention.

Further, as disclosed in Fig. 6 of Kuroda, the opening is provided so that the rotation axis of the swirling flow caused in the passage where the nozzle (22b) is disposed is directed in a perpendicular direction with respect to the premixing

flow and no swirling flow is caused along the axial direction of the premixing flow passage. Accordingly, Kuroda does not teach or suggest Applicants' invention as now claimed.

Concerning the cited Kusaba et al. JP 55046309-A reference, Fig. 5 of Kusaba discloses a provision of a plurality of openings with respect to a single premixing nozzle and the openings are formed so as to cause a swirling flow along an axial direction of the premixing flow passage, but Kusaba does not disclose the provision of one opening with respect to two adjacent premixing nozzles arranged in the circumferential direction as in Applicants' claimed invention.

Although Kusaba discloses the provision of openings which cause a swirling flow along the axial direction of the premixing flow passage, the structure thereof is a common tangential direction flow-in type of structure which is different from the present invention and is complex in comparison with the present invention.

Accordingly, Applicants' invention as now claimed, patentably distinguishes over the cited prior art, taken either alone or in combination.

In view of the foregoing amendments and remarks, Applicants contend that this application is in condition for allowance. Accordingly, reconsideration and reexamination are respectfully requested.

Respectfully submitted,

A handwritten signature in cursive script that reads "Gene W. Stockman".

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FIG. 37

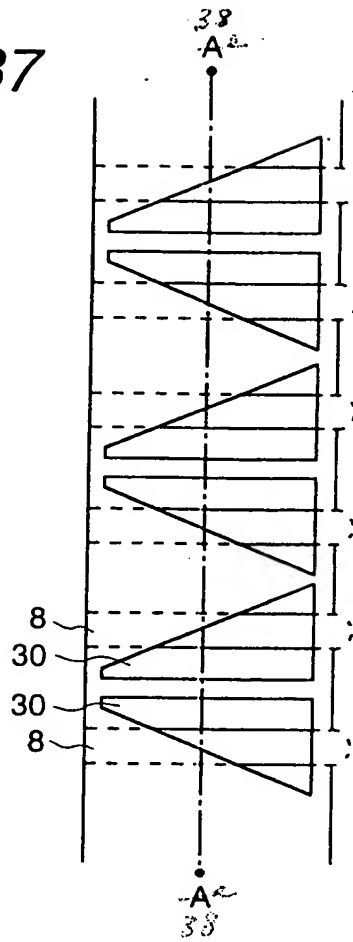


FIG. 39

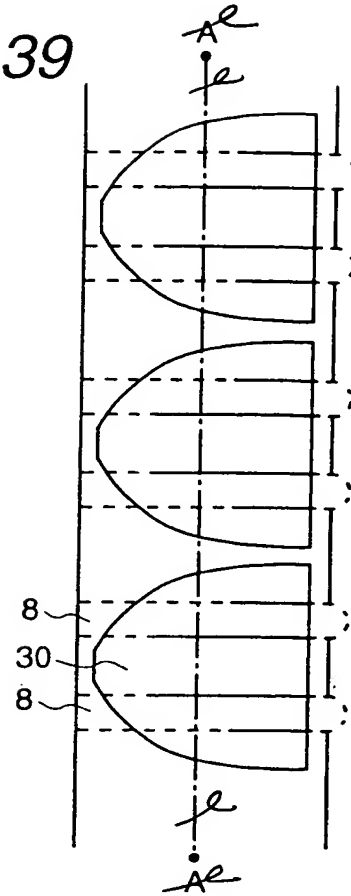
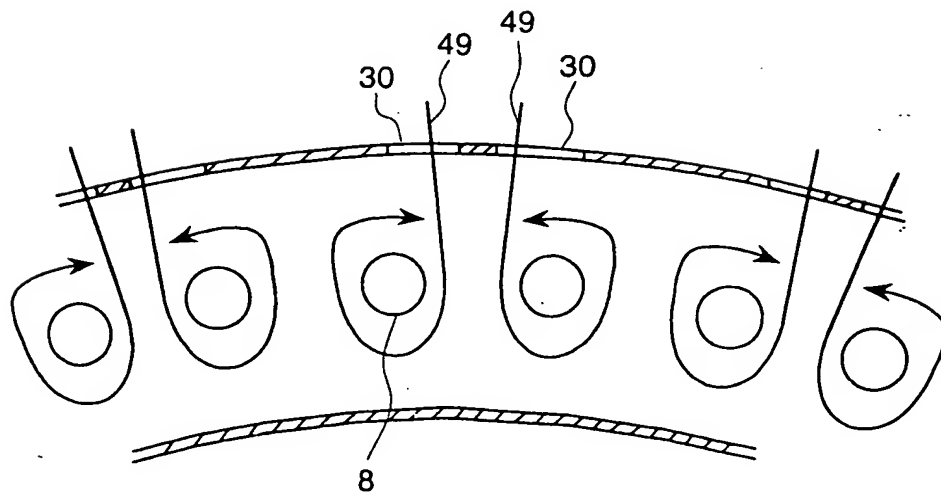


FIG. 38



38-38
A-A CROSS SECTION